WHAT IS CLAIMED AS NEW AND DESIRED TO BE SECURED BY LETTERS PATENT OF THE UNITED STATES IS:

1. A method for determining if a pulmonary nodule is malignant, comprising the steps of:

obtaining at least one computed tomography medical image of the pulmonary nodule;

obtaining at least one patient feature of a patient having the pulmonary nodule;

extracting image features of the pulmonary nodule from the at least one computed tomography medical image; and

evaluating whether the pulmonary nodule is malignant based on an examination of a total of seven of the patient or image features.

2. The method of claim 1, wherein the step of obtaining at least one computed tomography medical image comprises obtaining a medical X-ray image.

3. The method of claim 2, wherein the step of obtaining at least one computed tomography medical image comprises obtaining at least one low-dose computed tomography image.

4. The method of claim 1, wherein the step of obtaining at least one patient feature comprises obtaining at least one of sex and age of the patient having the pulmonary nodule.

5. The method of claim 1, wherein the step of extracting image features comprises at least one of the steps of:

identifying image features based on an outline of the at least one computed tomography medical image of the pulmonary nodule;

identifying image features based on linear patterns of the at least one computed tomography medical image of the pulmonary nodule;

identifying image features based on edge orientation of an edge gradient of the at least one computed tomography medical image of the pulmonary nodule;

identifying image features based on gray-level distribution of the at least one computed tomography medical image of the pulmonary nodules;

identifying image features based on the gray level distribution of an edge gradient of the at least one computed tomography medical image of the pulmonary nodule;

identifying image features based on the relationship between two histograms in the inside and outside regions of the segmented nodule of the at least one computed tomography medical image of the pulmonary nodule; and

identifying image features based on the relationship between two histograms in the inside and outside regions of the segmented nodule of an edge gradient of the at least one computed tomography medical image of the pulmonary nodule.

6. The method of claim 5, wherein step of identifying image features based on an outline of the at least one computed tomography medical image of the pulmonary nodule comprises at least one of the following steps:

identifying the effective diameter of the outline;

identifying the degree of circularity of the outline;

identifying the degree of ellipticity of the outline;

identifying the degree of irregularity of the outline;

identifying the root-mean-square variation of the power spectrum of the outline; and

identifying the power spectrum of the outline.

7. The method of claim 5, wherein the step of identifying image features based on the linear patterns of the at least one computed tomography medical image of the pulmonary nodule comprises:

identifying the magnitude of line patterns for inside region of a segmented nodule of the medical image; and

identifying the magnitude of line patterns for outside region of a segmented nodule of the medical image.

8. The method of claim 5, wherein the step of identifying image features based on edge orientation of an edge gradient of the at least one computed tomography medical image of the pulmonary nodule comprises:

identifying radial gradient index computed by the mean absolute value of a radial edge gradient projected along a radial direction for the inside of a segmented nodule of the medical image;

identifying radial gradient index computed by the mean absolute value of a radial edge gradient projected along a radial direction for the outside of a segmented nodule of the medical image;

identifying tangential gradient index computed by the mean absolute value of a tangential edge gradient projected along a tangential direction for the inside of a segmented nodule of the medical image; and

identifying tangential gradient computed by the mean absolute value of a tangential edge gradient projected along a tangential direction for the outside of a segmented nodule of the image.

9. The method of claim 1, wherein:

the step of obtaining the patient features consist of obtaining the sex of the patient; and

the step of extracting image features consists of extracting effective diameter of the pulmonary nodule, contrast of the pulmonary nodule, overlap measure of two gray-level

histograms for the inside and outside regions of a segmented nodule of the medical image, overlap measure of two gray-level histograms for the inside and outside region of a segmented nodule of an edge gradient of the medical image, radial gradient index for an inside region of a segmented nodule of the medical image, and peak value of a histogram for an inside regions of a segmented nodule of an edge gradient of the medical image.

10. The method of claim 1, wherein the step of extracting image features consists of extracting the effective diameter of the pulmonary nodule and the contrast of the pulmonary nodule.

11. The method of claim 1, wherein the step of obtaining at least one medical image comprises:

obtaining three medical images; and

the step of evaluating if the pulmonary nodules are malignant is based on the examination of the three medical images.

12. A computer readable medium storing computer program instructions for determining if a pulmonary nodule is malignant, which when used to program a computer to cause the computer to perform the any one of the steps of claims 1-11.

13. A system for implementing the method recited in any one of claims 1-11.

14. An apparatus for determining if a pulmonary nodule is malignant, comprising:

a means for obtaining a medical image of the pulmonary nodule;

a means for obtaining patient features of a patient having the pulmonary nodule;

a means for obtaining image features of the pulmonary nodule from the analysis of the medical image.

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